

## CLAIMS

1. A robot apparatus adapted to move in an environment containing one or more than one landmarks located therein, the robot apparatus comprising:

environment map building means for building an identifiable unique environment map by means of the location or the number of one or more than one landmarks according to the result of observation of the one or more than one landmarks and the movement/state quantity of the robot apparatus;

environment map storage means for storing a plurality of environment maps as registered environment maps; and

environment identifying means for determining if the current environment is identical with the environment indicated by the registered environment maps by comparing the registered environment maps stored in the environment map storage means and the current environment map built by the environment map building means.

2. An environment identifying apparatus to be used by a mobile body to identify the environment containing one or more than one landmarks located therein, while moving in the environment, the apparatus comprising:

environment map building means for building an identifiable unique environment map by means of the location or the number of one or more than one landmarks according to the result of observation of the one or more than one

landmarks and the movement/state quantity of the mobile body;

environment map storage means for storing a plurality of environment maps as registered environment maps; and

environment identifying means for determining if the current environment is identical with the environment indicated by the registered environment maps by comparing the registered environment maps stored in the environment map storage means and the current environment map built by the environment map building means.

3. The apparatus according to claim 2, wherein the registered environment maps are environment maps built by the environment map building means.

4. The apparatus according to claim 2, wherein the environment maps contain positional information on the landmarks and the environment map storage means stores environment identifying information for identifying the environments along with the environment maps.

5. The apparatus according to claim 4, wherein the environment identifying means computes the degree of similarity of the current environment map and each of the registered environment maps and identifies the current environment on the basis of the degrees of similarity.

6. The apparatus according to claim 5, wherein, when the degree of similarity between the current environment map and one of the registered environment maps is greater than a predetermined threshold value, the environment identifying means

identifies the current environment as the environment shown on the registered environment map and outputs the environment identifying information of the registered environment map.

7. The apparatus according to claim 5, wherein the environment identifying means has an adding means for adding the current environment map to the environment map storage means when the degree of similarity between the current environment map and each and every one of the registered environment maps is smaller than a predetermined threshold value.

8. The apparatus according to claim 2, further comprising:  
exploring means for exploring the inside of the identifiable unique environment.

9. The apparatus according to claim 8, further comprising:  
end of exploration control means for controlling the exploring means so as to end the exploration in the inside of the environment.

10. The apparatus according to claim 9, wherein the end of exploration control means ends the exploration of the exploring means when a predetermined number of landmarks are observed in the identifiable unique environment, when a predetermined period of time has elapsed since the start of exploration or when an instruction is given by the user who controls the mobile body so as to end the exploration in the environment.

11. The apparatus according to claim 2, wherein the identifiable unique

environment has a predetermined number of landmarks.

12. The apparatus according to claim 2, wherein the one or more than one landmarks are uniquely identifiable in the identifiable unique environment.

13. The apparatus according to claim 2, wherein the landmark or each of the more than one landmarks is formed by combining a plurality of geometrical patterns having different profiles and/or different colors.

14. The apparatus according to claim 13, wherein the environment map contains information on the direction of the landmark or each of the more than one landmarks along with information on the position of the landmark or each of the more than one landmarks.

15. The apparatus according to claim 2, wherein the movement/state quantity of the mobile body indicates the postural direction and the position of the mobile body.

16. The apparatus according to claim 2, wherein the mobile body is an autonomous type robot apparatus that behaves according to the input information supplied to it.

17. An environment identifying method to be used by a mobile body to identify the environment containing one or more than one landmarks located therein, while moving in the environment, the method comprising:

an environment map building step of building an identifiable unique environment map by means of the location or the number of one or more than one landmarks according to the result of observation of the one or more than one

landmarks and the movement/state quantity of the mobile body; and

an environment identifying step of determining if the current environment is identical with the environment indicated by a plurality of registered environment maps stored in an environment map storage means as registered environment maps by comparing the registered environment maps and the current environment map built in the environment map building step.

18. The method according to claim 17, further comprising:

a storing step of storing the environment map built in the environment map building step in the storage means as registered environment map.

19. The method according to claim 17, wherein the environment maps contain positional information on the landmarks and the environment map storage means stores environment identifying information for identifying the environments along with the environment maps.

20. The method according to claim 19, wherein the degree of similarity of the current environment map and each of the registered environment maps is computed and the current environment is identified on the basis of the degrees of similarity in the environment identifying step.

21. The method according to claim 20, wherein, when the degree of similarity between the current environment map and one of the registered environment maps is greater than a predetermined threshold value, the current environment is identified as the environment shown on the registered environment map and the environment

identifying information of the registered environment map is output in the environment identifying step.

22. The method according to claim 20, wherein, the current environment map is added to the environment map storage means when the degree of similarity between the current environment map and each and every one of the registered environment maps is smaller than a predetermined threshold value in the environment identifying step.

23. The method according to claim 17, further comprising:  
an exploring step of exploring the inside of the identifiable unique environment.

24. The method according to claim 23, wherein the exploration in the exploration step is ended when a predetermined number of landmarks are observed in the identifiable unique environment, when a predetermined period of time has elapsed since the start of exploration or when an instruction is given by the user who controls the mobile body so as to end the exploration in the environment.

25. A program for causing a computer to execute an operation of driving a mobile body to move in an environment containing one or more than one landmarks located therein, while moving in the environment, and identify the environment, the program comprising:

an environment map building step of building an identifiable unique environment map by means of the location or the number of one or more than one

landmarks according to the result of observation of the one or more than one landmarks and the movement/state quantity of the mobile body; and

an environment identifying step of determining if the current environment is identical with the environment indicated by a plurality of registered environment maps stored in an environment map storage means as registered environment maps by comparing the registered environment maps and the current environment map built in the environment map building step.

26. A storage medium storing a program for causing a computer to execute an operation of driving a mobile body to move in an environment containing one or more than one landmarks located therein, while moving in the environment, and identify the environment, the program comprising:

an environment map building step of building an identifiable unique environment map by means of the location or the number of one or more than one landmarks according to the result of observation of the one or more than one landmarks and the movement/state quantity of the mobile body; and

an environment identifying step of determining if the current environment is identical with the environment indicated by a plurality of registered environment maps stored in an environment map storage means as registered environment maps by comparing the registered environment maps and the current environment map built in the environment map building step.